

WHAT IS CLAIMED IS:

1. A substantially pure α -conotoxin peptide having the generic formula I: Xaa₁-Xaa₂-Xaa₃-Xaa₄-Xaa₅-Cys-Cys-Xaa₆-Xaa₇-Xaa₈-Xaa₉-Cys-Xaa₁₀-Xaa₁₁-Xaa₁₂-Cys-Xaa₁₃ (SEQ ID NO:1), wherein Xaa₁ is des-Xaa₁, Ile, Leu or Val; Xaa₂ is des-Xaa₂, Ala or Gly; Xaa₃ is des-Xaa₃, Gly, Trp (D or L), neo-Trp, halo-Trp or any unnatural aromatic amino acid; Xaa₄ is des-Xaa₄, Asp, Phe, Gly, Ala, Glu, γ -carboxy-Glu (Gla) or any unnatural aromatic amino acid; Xaa₅ is Glu, Gla, Asp, Ala, Thr, Ser, Gly, Ile, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₆ is Ser, Thr, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₇ is Asp, Glu, Gla, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₈ is Ser, Thr, Asn, Ala, Gly, His, halo-His, Pro or hydroxy-Pro; Xaa₉ is Thr, Ser, Ala, Asp, Asn, Pro, hydroxy-Pro, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₀ is Gly, Ser, Thr, Ala, Asn, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₁ is Gln, Leu, His, halo-His, Trp (D or L), halo-Trp, neo-Trp, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any unnatural basic amino acid or any unnatural aromatic amino acid; Xaa₁₂ is Asn, His, halo-His, Ile, Leu, Val, Gln, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₃ is des-Xaa₁₃, Val, Ile, Leu, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; and the C-terminus contains a free carboxyl group or an amide group.
2. A substantially pure α -conotoxin peptide of generic formula I selected from the group consisting of:
- Asp-Xaa₁-Cys-Cys-Ser-Asp-Ser-Arg-Cys-Gly-Xaa₂-Asn-Cys-Leu (SEQ ID NO:4);
 - Ala-Cys-Cys-Ser-Asp-Arg-Arg-Cys-Arg-Xaa₃-Arg-Cys (SEQ ID NO:5);
 - Phe-Thr-Cys-Cys-Arg-Arg-Gly-Thr-Cys-Ser-Gln-His-Cys (SEQ ID NO:6);

Asp-Xaa₄-Cys-Cys-Arg-Arg-His-Ala-Cys-Thr-Leu-Ile-Cys (SEQ ID NO:7);
 Asp-Xaa₄-Cys-Cys-Arg-Xaa₅-Xaa₅-Cys-Thr-Leu-Ile-Cys (SEQ ID NO:8);
 Gly-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Arg-Xaa₄-Arg-Cys-Arg (SEQ ID NO:9);
 Gly-Gly-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Ala-Xaa₃-Arg-Cys (SEQ ID NO:10);
 Ile-Ala-Xaa₃-Asp-Ile-Cys-Cys-Ser-Xaa₁-Xaa₅-Asp-Cys-Asn-His-Xaa₂-Cys-Val (SEQ
 ID NO:11); and

Gly-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Xaa₂-His-Gln-Cys (SEQ ID NO:12),
 wherein Xaa₁ is Glu or γ -carboxy-Glu (Gla); Xaa₂ is Lys, N-methyl-Lys, N,N-dimethyl-Lys
 or N,N,N-trimethyl-Lys; Xaa₃ is Trp (D or L), halo-Trp or neo-Trp; Xaa₄ is Tyr, nor-Tyr,
 mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr or nitro-Tyr; and Xaa₅ is Pro or
 hydroxy-Pro; and the C-terminus contains a carboxyl or amide group, or derivatives thereof.

3. The substantially pure α -conotoxin peptide of claim 2, wherein Xaa₁ is Glu.
4. The substantially pure α -conotoxin peptide of claim 2, wherein Xaa₂ is Lys.
5. The substantially pure α -conotoxin peptide of claim 2, wherein Xaa₄ is Tyr.
6. The substantially pure α -conotoxin peptide of claim 2, wherein Xaa₄ is mono-iodo-Tyr.
7. The substantially pure α -conotoxin peptide of claim 2, wherein Xaa₄ is di-iodo-Tyr.
8. The substantially pure α -conotoxin peptide of claim 1, which is modified to contain an O-glycan, an S-glycan or an N-glycan.
9. The substantially pure α -conotoxin peptide of claim 2 which is modified to contain an O-glycan, an S-glycan or an N-glycan.
10. A substantially pure α -conotoxin peptide having the generic formula II: Xaa₁-Xaa₂-Xaa₃-Xaa₄-Cys-Cys-Xaa₅-Xaa₆-Xaa₇-Xaa₈-Cys-Xaa₉-Xaa₁₀-Xaa₁₁-Xaa₁₂-Xaa₁₃-Xaa₁₄-Cys-Xaa₁₅-Xaa₁₆-Xaa₁₇ (SEQ ID NO:2), wherein Xaa₁ is des-Xaa₁, Asp, Glu or γ -carboxy-Glu (Gla);

Xaa₂ is des-Xaa₂, Gln, Ala, Asp, Glu, Gla; Xaa₃ is des-Xaa₃, Gly, Ala, Asp, Glu, Gla, Pro
 or hydroxy-Pro; Xaa₄ is des-Xaa₄, Gly, Glu, Gla, Gln, Asp, Asn, Pro or hydroxy-Pro; Xaa₅
 is Ser, Thr, Gly, Glu, Gla, Asn, Trp (D or L), neo-Trp, halo-Trp, Arg, ornithine,
 homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any unnatural
 basic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr,
 nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₆ is Asp, Asn, His, halo-His,
 Thr, Ser, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-
 Tyr or any unnatural hydroxy containing amino acid; Xaa₇ is Pro or hydroxy-Pro; Xaa₈ is
 Ala, Ser, Thr, Asp, Val, Ile, Pro, hydroxy-Pro, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr,
 O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid;
 Xaa₉ is Gly, Ile, Leu, Val, Ala, Thr, Ser, Pro, hydroxy-Pro, Phe, Trp (D or L), neo-Trp, halo-
 Trp, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-
 Lys, any unnatural basic amino acid or any unnatural aromatic amino acid; Xaa₁₀ is Ala,
 Asn, Phe, Pro, hydroxy-Pro, Glu, Gla, Gln, His, halo-His, Val, Ser, Thr, Arg, ornithine,
 homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any
 unnatural basic amino acid; Xaa₁₁ is Thr, Ser, His, halo-His, Leu, Ile, Val, Asn, Met, Pro,
 hydroxy-Pro, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-
 trimethyl-Lys, any unnatural basic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr,
 O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid;
 Xaa₁₂ is Asn, Pro, hydroxy-Pro, Gln, Ser, Thr, Arg, ornithine, homoarginine, Lys, N-methyl-
 Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any unnatural basic amino acid, Tyr, nor-Tyr,
 mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural
 hydroxy containing amino acid; Xaa₁₃ is des-Xaa₁₃, Gly, Thr, Ser, Pro, hydroxy-Pro, Tyr,
 nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any
 unnatural hydroxy containing amino acid; Xaa₁₄ is des-Xaa₁₄, Ile, Val, Asp, Leu, Phe, Arg,
 ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any
 unnatural basic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-
 phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; and Xaa₁₅ is des-
 Xaa₁₅, Gly, Ala, Met, Ser, Thr, Trp (D or L), neo-Trp, halo-Trp, any unnatural aromatic
 amino acid, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-
 trimethyl-Lys or any unnatural basic amino acid; Xaa₁₆ is des-Xaa₁₆, Trp (D or L), neo-Trp,
 halo-Trp, any unnatural aromatic amino acid, Arg, ornithine, homoarginine, Lys, N-methyl-

Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₇ is des-Xaa₁₇, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; and the C-terminus contains a free carboxyl group or an amide group.

11. A substantially pure α -conotoxin peptide of generic formula II selected from the group consisting of:

Cys-Cys-Ser-Asp-Xaa₅-Ala-Cys-Xaa₂-Gln-Thr-Xaa₅-Gly-Cys-Arg (SEQ ID NO:13);

Cys-Cys-Xaa₁-Asn-Xaa₅-Ala-Cys-Arg-His-Thr-Gln-Gly-Cys (SEQ ID NO:14);

Gly-Cys-Cys-Xaa₃-His-Xaa₅-Ala-Cys-Gly-Arg-His-Xaa₄-Cys (SEQ ID NO:15);

Ala-Xaa₅-Cys-Cys-Asn-Asn-Xaa₅-Ala-Cys-Val-Xaa₂-His-Arg-Cys (SEQ ID NO:16);

Ala-Xaa₅-Gly-Cys-Cys-Asn-Asn-Xaa₅-Ala-Cys-Val-Xaa₂-His-Arg-Cys (SEQ ID NO:17);

Xaa₅-Xaa₅-Cys-Cys-Asn-Asn-Xaa₅-Ala-Cys-Val-Xaa₂-His-Arg-Cys (SEQ ID NO:18);

Asp-Xaa₁-Asn-Cys-Cys-Xaa₃-Asn-Xaa₅-Ser-Cys-Xaa₅-Arg-Xaa₅-Arg-Cys-Thr (SEQ ID NO:19);

Gly-Cys-Cys-Ser-Thr-Xaa₅-Xaa₅-Cys-Ala-Val-Leu-Xaa₄-Cys (SEQ ID NO:20);

Gly-Cys-Cys-Gly-Asn-Xaa₅-Asp-Cys-Thr-Ser-His-Ser-Cys (SEQ ID NO:21);

Gly-Cys-Cys-Ser-Asn-Xaa₅-Xaa₅-Cys-Ala-His-Asn-Asn-Xaa₅-Asp-Cys-Arg (SEQ ID NO:42);

Gly-Cys-Cys-Xaa₄-Asn-Xaa₅-Val-Cys-Xaa₂-Xaa₂-Xaa₄-Xaa₄-Cys-Xaa₃-Xaa₂ (SEQ ID NO:154);

Xaa₆-Xaa₁-Xaa₅-Gly-Cys-Cys-Arg-His-Xaa₅-Ala-Cys-Gly-Xaa₂-Asn-Arg-Cys (SEQ ID NO:155);

Cys-Cys-Ala-Asp-Xaa₅-Asp-Cys-Arg-Phe-Arg-Xaa₅-Gly-Cys (SEQ ID NO:156);

Gly-Cys-Cys-Xaa₄-Asn-Xaa₅-Ser-Cys-Xaa₃-Xaa₅-Xaa₂-Thr-Xaa₄-Cys-Ser-Xaa₃-Xaa₂ (SEQ ID NO:157);

Cys-Cys-Ser-Asn-Xaa₅-Thr-Cys-Xaa₂-Xaa₁-Thr-Xaa₄-Gly-Cys (SEQ ID NO:158);

Cys-Cys-Ala-Asn-Xaa₅-Ile-Cys-Xaa₂-Asn-Thr-Xaa₅-Gly-Cys (SEQ ID NO:159);

Cys-Cys-Asn-Asn-Xaa₅-Thr-Cys-Xaa₂-Xaa₁-Thr-Xaa₄-Gly-Cys (SEQ ID NO:160);

Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-Xaa₂-Xaa₁-Thr-Xaa₄-Gly-Cys (SEQ ID NO:161);

Gly-Gly-Cys-Cys-Ser-Xaa₄-Xaa₅-Xaa₅-Cys-Ile-Ala-Ser-Asn-Xaa₅-Xaa₂-Cys-Gly
(SEQ ID NO:162);

Gly-Cys-Cys-Ser-His-Xaa₅-Val-Cys-Ser-Ala-Met-Ser-Xaa₅-Ile-Cys (SEQ ID
NO:163);

Gly-Cys-Cys-Xaa₂-Asn-Xaa₅-Xaa₄-Cys-Gly-Ala-Ser-Xaa₂-Thr-Xaa₄-Cys (SEQ ID
NO:164);

Gly-Cys-Cys-Ser-Xaa₄-Xaa₅-Xaa₅-Cys-Phe-Ala-Thr-Asn-Xaa₅-Asp-Cys (SEQ ID
NO:165);

Gly-Gly-Cys-Cys-Ser-Xaa₄-Xaa₅-Xaa₅-Cys-Ile-Ala-Asn-Asn-Xaa₅-Leu-Cys-Ala
(SEQ ID NO:166);

Gly-Gly-Cys-Cys-Ser-Xaa₄-Xaa₅-Xaa₅-Cys-Ile-Ala-Asn-Asn-Xaa₅-Phe-Cys-Ala
(SEQ ID NO:167);

Asp-Cys-Cys-Ser-Asn-Xaa₅-Xaa₅-Cys-Ser-Gln-Asn-Asn-Xaa₅-Asp-Cys-Met (SEQ
ID NO:168); and

Asp-Cys-Cys-Ser-Asn-Xaa₅-Xaa₅-Cys-Ala-His-Asn-Asn-Xaa₅-Asp-Cys-Arg (SEQ
ID NO:169),

wherein Xaa₁ is Glu or γ -carboxy-Glu (Gla); Xaa₂ is Lys, N-methyl-Lys, N,N-dimethyl-Lys
or N,N,N-trimethyl-Lys; Xaa₃ is Trp (D or L), halo-Trp or neo-Trp; Xaa₄ is Tyr, nor-Tyr,
mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr or nitro-Tyr; and Xaa₅ is Pro or
hydroxy-Pro; and the C-terminus contains a carboxyl or amide group, or derivatives thereof.

12. The substantially pure α -conotoxin peptide of claim 11, wherein Xaa₂ is Lys.
13. The substantially pure α -conotoxin peptide of claim 11, wherein Xaa₁ is Glu.
14. The substantially pure α -conotoxin peptide of claim 11, wherein Xaa₃ is Trp.
15. The substantially pure α -conotoxin peptide of claim 11, wherein Xaa₄ is Tyr.
16. The substantially pure α -conotoxin peptide of claim 11, wherein Xaa₄ is mono-iodo-Tyr.
17. The substantially pure α -conotoxin peptide of claim 11, wherein Xaa₄ is di-iodo-Tyr.

18. The substantially pure α -conotoxin peptide of claim 10, which is modified to contain an O-glycan, an S-glycan or an N-glycan.
19. The substantially pure α -conotoxin peptide of claim 11 which is modified to contain an O-glycan, an S-glycan or an N-glycan.
- 5 20. A substantially pure α -conotoxin peptide having the generic formula III: Xaa₁-Xaa₂-Xaa₃-Xaa₄-Xaa₅-Cys-Cys-Xaa₆-Xaa₇-Xaa₈-Xaa₉-Cys-Xaa₁₀-Xaa₁₁-Xaa₁₂-Xaa₁₃-Xaa₁₄-Xaa₁₅-Xaa₁₆-Cys-Xaa₁₇-Xaa₁₈-Xaa₁₉-Xaa₂₀-Xaa₂₁-Xaa₂₂-Xaa₂₃-Xaa₂₄ (SEQ ID NO:3), wherein Xaa₁ is des-Xaa₁, Ser or Thr; Xaa₂ is des-Xaa₂, Asp, Glu, γ -carboxy-Glu (Gla), Asn, Ser or Thr; Xaa₃ is des-Xaa₃, Ala, Gly, Asn, Ser, Thr, Pro, hydroxy-Pro, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₄ is des-Xaa₄, Ala, Val, Leu, Ile, Gly, Glu, Gla, Gln, Asp, Asn, Phe, Pro, hydroxy-Pro or any unnatural aromatic amino acid; Xaa₅ is des-Xaa₅, Thr, Ser, Asp, Glu, Gla, Gln, Gly, Val, Asp, Asn, Ala, Pro, hydroxy-Pro, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₆ is Thr, Ser, Asp, Asn, Met, Val, Ala, Gly, Leu, Ile, Phe, any unnatural aromatic amino acid, Pro, hydroxy-Pro, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₇ is Ile, Leu, Val, Ser, Thr, Gln, Asn, Asp, Arg, His, halo-His, Phe, any unnatural aromatic amino acid, homoarginine, ornithine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any unnatural basic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₈ is Pro, hydroxy-Pro, Ser, Thr, Ile, Asp, Leu, Val, Gly, Ala, Phe, any unnatural aromatic amino acid, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₉ is Val, Ala, Gly, Ile, Leu, Asp, Ser, Thr, Pro, hydroxy-Pro, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₀ is His, halo-His, Arg, homoarginine, ornithine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any unnatural basic amino acid, Asn, Ala, Ser, Thr, Phe, Ile, Leu, Gly, Trp (D or L), neo-Trp, halo-Trp, any unnatural aromatic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₁₁ is Leu, Gln, Val, Ile,

Gly, Met, Ala, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, Ser, Thr, Arg, homoarginine, ornithine, any unnatural basic amino acid, Asn, Glu, Gla, Gln, Phe, Trp (D or L), neo-Trp, halo-Trp or any unnatural aromatic amino acid; Xaa₁₂ is Glu, Gla, Gln, Asn, Asp, Pro, hydroxy-Pro, Ser, Gly, Thr, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, Arg, homoarginine, ornithine, any unnatural basic amino acid, Phe, His, halo-His, any unnatural aromatic amino acid, Leu, Met, Gly, Ala, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₁₃ is His, halo-His, Asn, Thr, Ser, Ile, Val, Leu, Phe, any unnatural aromatic amino acid, Arg, homoarginine, ornithine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any unnatural basic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₁₄ is Ser, Thr, Ala, Gln, Pro, hydroxy-Pro, Gly, Ile, Leu, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₅ is Asn, Glu, Gla, Asp, Gly, His, halo-His, Ala, Leu, Gln, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys, any unnatural basic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr or any unnatural hydroxy containing amino acid; Xaa₁₆ is Met, Ile, Thr, Ser, Val, Leu, Pro, hydroxy-Pro, Phe, any unnatural aromatic amino acid, Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr, any unnatural hydroxy containing amino acid, Glu, Gla, Ala, His, halo-His, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₇ is des-Xaa₁₇, Gly, Asp, Asn, Ala, Ile, Leu, Ser, Thr, His, halo-His, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₈ is des-Xaa₁₈, Gly, Glu, Gla, Gln, Trp (D or L), neo, halo-Trp, any unnatural aromatic amino acid, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₁₉ is des-Xaa₁₉, Ser, Thr, Val, Ile, Ala, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₂₀ is des-Xaa₂₀, Val, Asp, His, halo-His, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₂₁ is des-Xaa₂₁, Asn, Pro or hydroxy-Pro; Xaa₂₂ is des-Xaa₂₂, Arg, ornithine, homoarginine, Lys, N-methyl-Lys, N,N-dimethyl-Lys, N,N,N-trimethyl-Lys or any unnatural basic amino acid; Xaa₂₃ is des-Xaa₂₃,

Ser or Thr; Xaa₂₄ is des-Xaa₂₄, Leu, Ile or Val; and the C-terminus contains a free carboxyl group or an amide group, with the proviso that (a) Xaa₅ is not Gly, when Xaa₁ is des-Xaa₁, Xaa₂ is des-Xaa₂, Xaa₃ is des-Xaa₃, Xaa₄ is des-Xaa₄, Xaa₆ is Ser, Xaa₇ is His, Xaa₈ is Pro, Xaa₉ is Ala, Xaa₁₀ is Ser, Xaa₁₁ is Val, Xaa₁₂ is Asn, Xaa₁₃ is Asn, Xaa₁₄ is Pro, Xaa₁₅ is Asp, Xaa₁₆ is Ile, Xaa₁₇ is des-Xaa₁₇, Xaa₁₈ is des-Xaa₁₈, Xaa₁₉ is des-Xaa₁₉, Xaa₂₀ is des-Xaa₂₀, Xaa₂₁ is des-Xaa₂₁, Xaa₂₂ is des-Xaa₂₂, Xaa₂₃ is des-Xaa₂₃, and Xaa₂₄ is des-Xaa₂₄.

21. A substantially pure α -conotoxin peptide of generic formula III selected from the group consisting of:

Gly-Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-His-Leu-Xaa₁-His-Ser-Asn-Met-Cys (SEQ ID NO:22);

Gly-Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-Arg-Gln-Asn-Asn-Ala-Xaa₁-Xaa₄-Cys-Arg (SEQ ID NO:23);

Xaa₅-Gln-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Arg (SEQ ID NO:24);

Xaa₅-Xaa₁-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Arg (SEQ ID NO:25);

Xaa₅-Gln-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Asp (SEQ ID NO:26);

Xaa₅-Arg-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Arg (SEQ ID NO:27);

Xaa₅-Gln-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Gly-Ile-Cys-Arg (SEQ ID NO:28);

Xaa₅-Gln-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Thr-Cys-Arg (SEQ ID NO:29);

Xaa₅-Gln-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Val-Cys-Arg (SEQ ID NO:30);

Xaa₅-Gln-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Ile-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Arg (SEQ ID NO:31);

Xaa₅-Gln-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Arg-Arg-Arg-Arg (SEQ ID NO:32);

Gly-Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ala-Val-Asn-His-Xaa₅-Xaa₁-Leu-Cys
(SEQ ID NO:33);

Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ser-Val-Asn-His-Xaa₅-Xaa₁-Leu-Cys (SEQ ID
NO:34);

5 Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys (SEQ ID
NO:35);

Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ser-Gly-Xaa₂-Thr-Gln-Xaa₁-Xaa₅-Cys-Arg-
Xaa₁-Ser (SEQ ID NO:36);

10 Xaa₅-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ser-Gly-Asn-Asn-Xaa₅-Xaa₁-Phe-Cys-Arg-Gln
(SEQ ID NO:37);

Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ser-Gly-Asn-Asn-Xaa₅-Xaa₁-Phe-Cys-Arg-Gln
(SEQ ID NO:38);

Gly-Cys-Cys-Ser-His-Xaa₅-Xaa₅-Cys-Ala-Met-Asn-Asn-Xaa₅-Asp-Xaa₄-Cys (SEQ
ID NO:39);

15 Gly-Cys-Cys-Ser-His-Xaa₅-Xaa₅-Cys-Phe-Leu-Asn-Asn-Xaa₅-Asp-Xaa₄-Cys (SEQ
ID NO:40);

Gly-Cys-Cys-Ser-Asn-Xaa₅-Xaa₅-Cys-Ile-Ala-Xaa₂-Asn-Xaa₅-His-Met-Cys-Gly
(SEQ ID NO:41);

20 Gly-Cys-Cys-Ser-Asn-Xaa₅-Ala-Cys-Ala-Gly-Asn-Asn-Xaa₅-His-Val-Cys-Arg-Gln
(SEQ ID NO:43);

Gly-Cys-Cys-Ser-Arg-Xaa₅-Ala-Cys-Ile-Ala-Asn-Asn-Xaa₅-Asp-Leu-Cys (SEQ ID
NO:44);

Gly-Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-His-Val-Xaa₁-His-Xaa₅-Xaa₁-Leu-Cys-Arg-
Arg-Arg-Arg (SEQ ID NO:45);

25 Gly-Gly-Cys-Cys-Ser-Phe-Xaa₅-Ala-Cys-Arg-Xaa₂-Xaa₅-Arg-Xaa₅-Xaa₁-Met-Cys-
Gly (SEQ ID NO:46);

Xaa₅-Xaa₁-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Asn-Ser-Ser-His-Xaa₅-Xaa₁-Leu-Cys-
Gly (SEQ ID NO:47);

30 Xaa₅-Gln-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Asn-Val-Gly-His-Xaa₅-Xaa₁-Leu-Cys-
Gly (SEQ ID NO:48);

Xaa₆-Val-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Asn-Val-Gly-His-Xaa₅-Xaa₁-Ile-Cys-Gly
(SEQ ID NO:49);

Gly-Cys-Cys-Ser-Arg-Xaa₅-Xaa₅-Cys-Ile-Ala-Asn-Asn-Xaa₅-Asp-Leu-Cys (SEQ ID NO:50);

Xaa₅-Gln-Cys-Cys-Ser-His-Leu-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Arg (SEQ ID NO:51);

5 Gly-Cys-Cys-Ser-Xaa₄-Phe-Asp-Cys-Arg-Met-Met-Phe-Xaa₅-Xaa₁-Met-Cys-Gly-Xaa₃-Arg (SEQ ID NO:52);

Gly-Gly-Cys-Cys-Ser-Phe-Ala-Ala-Cys-Arg-Xaa₂-Xaa₄-Arg-Xaa₅-Xaa₁-Met-Cys-Gly (SEQ ID NO:53);

10 Gly-Gly-Cys-Cys-Phe-His-Xaa₅-Val-Cys-Xaa₄-Ile-Asn-Leu-Leu-Xaa₁-Met-Cys-Arg-Gln-Arg (SEQ ID NO:54);

Ser-Ala-Thr-Cys-Cys-Asn-Xaa₄-Xaa₅-Xaa₅-Cys-Xaa₄-Xaa₁-Thr-Xaa₄-Xaa₅-Xaa₁-Ser-Cys-Leu (SEQ ID NO:55);

Ala-Cys-Cys-Ala-Xaa₄-Xaa₅-Xaa₅-Cys-Phe-Xaa₁-Ala-Xaa₄-Xaa₅-Xaa₁-Arg-Cys-Leu (SEQ ID NO:56);

15 Asn-Ala-Xaa₁-Cys-Cys-Xaa₄-Xaa₄-Xaa₅-Xaa₅-Cys-Xaa₄-Xaa₁-Ala-Xaa₄-Xaa₅-Xaa₁-Ile-Cys-Leu (SEQ ID NO:57);

Xaa₁-Cys-Cys-Thr-Asn-Xaa₅-Val-Cys-His-Ala-Xaa₁-His-Gln-Xaa₁-Leu-Cys-Ala-Arg-Arg-Arg (SEQ ID NO:170);

20 Gly-Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-His-Leu-Xaa₁-His-Ser-Asn-Leu-Cys (SEQ ID NO:171);

Xaa₁-Cys-Cys-Thr-Asn-Xaa₅-Val-Cys-His-Val-Xaa₁-His-Gln-Xaa₁-Leu-Cys-Ala-Arg-Arg-Arg (SEQ ID NO:172);

Xaa₆-Xaa₁-Cys-Cys-Ser-Xaa₄-Xaa₅-Ala-Cys-Asn-Leu-Asp-His-Xaa₅-Xaa₁-Leu-Cys (SEQ ID NO:173);

25 Xaa₅-Xaa₁-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Asn-Ser-Thr-His-Xaa₅-Xaa₁-Leu-Cys-Gly (SEQ ID NO:174);

Leu-Asn-Cys-Cys-Met-Ile-Xaa₅-Xaa₅-Cys-Xaa₃-Xaa₂-Xaa₂-Xaa₄-Gly-Asp-Arg-Cys-Ser-Xaa₁-Val-Arg (SEQ ID NO:175);

30 Ala-Phe-Gly-Cys-Cys-Asp-Leu-Ile-Xaa₅-Cys-Leu-Xaa₁-Arg-Xaa₄-Gly-Asn-Arg-Cys-Asn-Xaa₁-Val-His (SEQ ID NO:176);

Leu-Gly-Cys-Cys-Asn-Val-Thr-Xaa₅-Cys-Xaa₃-Xaa₁-Xaa₂-Xaa₄-Gly-Asp-Xaa₂-Cys-Asn-Xaa₁-Val-Arg (SEQ ID NO:177);

Asp-Xaa₁-Cys-Cys-Ser-Asn-Xaa₅-Ala-Cys-Arg-Val-Asn-Asn-Xaa₅-His-Val-Cys-Arg-Arg-Arg (SEQ ID NO:178);

Leu-Asn-Cys-Cys-Ser-Ile-Xaa₅-Gly-Cys-Xaa₃-Asn-Xaa₁-Xaa₄-Xaa₂-Asp-Arg-Cys-Ser-Xaa₂-Val-Arg (SEQ ID NO:179);

5 Gly-Gly-Cys-Cys-Ser-His-Xaa₅-Val-Cys-Xaa₄-Phe-Asn-Asn-Xaa₅-Gln-Met-Cys-Arg (SEQ ID NO:180);

Gly-Gly-Cys-Cys-Ser-His-Xaa₅-Val-Cys-Asn-Leu-Asn-Asn-Xaa₅-Gln-Met-Cys-Arg (SEQ ID NO:181);

10 Gly-Cys-Cys-Ser-His-Xaa₅-Xaa₅-Cys-Xaa₄-Ala-Asn-Asn-Gln-Ala-Xaa₄-Cys-Asn (SEQ ID NO:182);

Gly-Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ser-Val-Thr-His-Xaa₅-Xaa₁-Leu-Cys (SEQ ID NO:183);

Gly-Gly-Cys-Cys-Ser-Xaa₄-Xaa₅-Ala-Cys-Ser-Val-Xaa₁-His-Gln-Asp-Leu-Cys-Asp (SEQ ID NO:184);

15 Val-Ser-Cys-Cys-Val-Val-Arg-Xaa₅-Cys-Xaa₃-Ile-Arg-Xaa₄-Gln-Xaa₁-Xaa₁-Cys-Leu-Xaa₁-Ala-Asp-Xaa₅-Arg-Thr-Leu (SEQ ID NO:185);

Xaa₆-Asn-Cys-Cys-Ser-Ile-Xaa₅-Gly-Cys-Xaa₃-Xaa₁-Xaa₂-Xaa₄-Gly-Asp-Xaa₂-Cys-Ser-Xaa₁-Val-Arg (SEQ ID NO:186);

20 Gly-Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-His-Leu-Xaa₁-His-Xaa₅-Asn-Ala-Cys (SEQ ID NO:187);

Gly-Cys-Cys-Ser-Asn-Xaa₅-Ile-Cys-Xaa₄-Phe-Asn-Asn-Xaa₅-Arg-Ile-Cys-Arg (SEQ ID NO:188);

Xaa₁-Cys-Cys-Ser-Gln-Xaa₅-Xaa₅-Cys-Arg-Xaa₃-Xaa₂-His-Xaa₅-Xaa₁-Leu-Cys-Ser (SEQ ID NO:189);

25 Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ala-Gly-Asn-Asn-Gln-His-Ile-Cys (SEQ ID NO:190);

Gly-Cys-Cys-Ala-Val-Xaa₅-Ser-Cys-Arg-Leu-Arg-Asn-Xaa₅-Asp-Leu-Cys-Gly-Gly (SEQ ID NO:191);

30 Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asn-Asn-Xaa₅-His-Ile-Cys (SEQ ID NO:192);

Thr-Xaa₅-Xaa₁-Xaa₁-Cys-Cys-Xaa₅-Asn-Xaa₅-Xaa₅-Cys-Phe-Ala-Thr-Asn-Ser-Asp-Ile-Cys-Gly (SEQ ID NO:193);

Asp-Ala-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Ser-Gly-Xaa₂-His-Gln-Asp-Leu-Cys (SEQ ID NO:194);

Xaa₁-Asp-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Ser-Val-Gly-His-Gln-Asp-Leu-Cys (SEQ ID NO:195);

5 Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ala-Gly-Ser-Asn-Ala-His-Ile-Cys (SEQ ID NO:196);

Xaa₁-Asp-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Ser-Val-Gly-His-Gln-Asp-Met-Cys (SEQ ID NO:197);

10 Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ala-Gly-Asn-Asn-Xaa₅-His-Ile-Cys (SEQ ID NO:198);

Gly-Cys-Cys-Gly-Asn-Xaa₅-Ser-Cys-Ser-Ile-His-Ile-Xaa₅-Xaa₄-Val-Cys-Asn (SEQ ID NO:199);

Thr-Asp-Ser-Xaa₁-Xaa₁-Cys-Cys-Leu-Asp-Ser-Arg-Cys-Ala-Gly-Gln-His-Gln-Asp-Leu-Cys-Gly (SEQ ID NO:200);

15 Gly-Cys-Cys-Ser-Asn-Xaa₅-Xaa₅-Cys-Xaa₄-Ala-Asn-Asn-Gln-Ala-Xaa₄-Cys-Asn (SEQ ID NO:201);

Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ser-Val-Asn-Asn-Xaa₅-Asp-Ile-Cys (SEQ ID NO:202);

20 Gly-Xaa₂-Cys-Cys-Ile-Asn-Asp-Ala-Cys-Arg-Ser-Xaa₂-His-Xaa₅-Gln-Xaa₄-Cys-Ser (SEQ ID NO:203);

Gly-Cys-Cys-Xaa₄-Asn-Ile-Ala-Cys-Arg-Ile-Asn-Asn-Xaa₅-Arg-Xaa₄-Cys-Arg (SEQ ID NO:204);

Gly-Cys-Cys-Ser-His-Xaa₅-Val-Cys-Arg-Phe-Asn-Xaa₄-Xaa₅-Xaa₂-Xaa₄-Cys-Gly (SEQ ID NO:205);

25 Asp-Xaa₁-Cys-Cys-Ala-Ser-Xaa₅-Xaa₅-Cys-Arg-Leu-Asn-Asn-Xaa₅-Xaa₄-Val-Cys-His (SEQ ID NO:206);

Gly-Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-Xaa₃-Gln-Asn-Asn-Ala-Xaa₁-Xaa₄-Cys-Arg-Xaa₁-Ser (SEQ ID NO:207);

30 Gly-Cys-Cys-Ser-His-Xaa₅-Xaa₅-Cys-Ala-Gln-Asn-Asn-Gln-Asp-Xaa₄-Cys (SEQ ID NO:208);

Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ser-Gly-Asn-Asn-Arg-Xaa₁-Xaa₄-Cys-Arg-Xaa₁-Ser (SEQ ID NO:209);

Asp-Xaa₅-Cys-Cys-Ser-Xaa₄-Xaa₅-Asp-Cys-Gly-Ala-Asn-His-Xaa₅-Xaa₁-Ile-Cys-Gly (SEQ ID NO:210);

Xaa₁-Cys-Cys-Ser-Gln-Xaa₅-Xaa₅-Cys-Arg-Xaa₃-Xaa₂-His-Xaa₅-Xaa₁-Leu-Cys-Ser (SEQ ID NO:211);

5 Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Ala-Gly-Asn-Asn-Xaa₅-His-Ile-Cys (SEQ ID NO:212);

Gly-Cys-Cys-Ser-Asp-Xaa₅-Ser-Cys-Asn-Val-Asn-Asn-Xaa₅-Asp-Xaa₄-Cys (SEQ ID NO:213);

10 Xaa₁-Xaa₁-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-Ser-Val-Gly-His-Gln-Asp-Met-Cys-Arg (SEQ ID NO:214);

Gly-Gly-Cys-Cys-Ser-Asn-Xaa₅-Ala-Cys-Leu-Val-Asn-His-Leu-Xaa₁-Met-Cys (SEQ ID NO:215);

Arg-Asp-Xaa₅-Cys-Cys-Phe-Asn-Xaa₅-Ala-Cys-Asn-Val-Asn-Asn-Xaa₅-Gln-Ile-Cys (SEQ ID NO:216);

15 Cys-Cys-Ser-Asp-Xaa₅-Ser-Cys-Xaa₃-Arg-Leu-His-Ser-Leu-Ala-Cys-Thr-Gly-Ile-Val-Asn-Arg (SEQ ID NO:217);

Cys-Cys-Thr-Asn-Xaa₅-Ala-Cys-Leu-Val-Asn-Asn-Ile-Arg-Phe-Cys-Gly (SEQ ID NO:218);

20 Asp-Xaa₁-Cys-Cys-Ser-Asp-Xaa₅-Arg-Cys-His-Gly-Asn-Asn-Arg-Asp-His-Cys-Ala (SEQ ID NO:219);

Asp-Cys-Cys-Ser-His-Xaa₅-Leu-Cys-Arg-Leu-Phe-Val-Xaa₅-Gly-Leu-Cys-Ile (SEQ ID NO:220);

Gly-Cys-Cys-Ser-His-Xaa₅-Val-Cys-Xaa₂-Val-Arg-Xaa₄-Xaa₅-Asp-Leu-Cys-Arg (SEQ ID NO:221);

25 Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asn-Asn-Xaa₅-His-Ile-Cys (SEQ ID NO:222);

Gly-Cys-Cys-Ser-His-Xaa₅-Val-Cys-Xaa₂-Val-Arg-Xaa₄-Ser-Asp-Met-Cys (SEQ ID NO:223);

30 Gly-Gly-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Xaa₂-Val-His-Phe-Xaa₅-His-Ser-Cys (SEQ ID NO:224);

Val-Cys-Cys-Ser-Asn-Xaa₅-Val-Cys-His-Val-Asp-His-Xaa₅-Xaa₁-Leu-Cys-Arg-Arg-Arg-Arg (SEQ ID NO:225);

Gly-Cys-Cys-Ser-His-Xaa₅-Val-Cys-Asn-Leu-Ser-Asn-Xaa₅-Gln-Ile-Cys-Arg (SEQ ID NO:226);

Xaa₆-Xaa₁-Cys-Cys-Ser-His-Xaa₅-Ala-Cys-Asn-Val-Asp-His-Xaa₅-Xaa₁-Ile-Cys-Arg (SEQ ID NO:227);

Gly-Cys-Cys-Ser-Asn-Xaa₅-Ala-Cys-Leu-Val-Asn-His-Ile-Arg-Phe-Cys-Gly (SEQ ID NO:228);

Asp-Cys-Cys-Asp-Asp-Xaa₅-Ala-Cys-Thr-Val-Asn-Asn-Xaa₅-Gly-Leu-Cys-Thr (SEQ ID NO:229); and

Gly-Cys-Cys-Ser-Asn-Xaa₅-Xaa₅-Cys-Ile-Ala-Xaa₂-Asn-Xaa₅-His-Met-Cys-Gly-Gly-Arg-Arg (SEQ ID NO:230),

wherein Xaa₁ is Glu or γ -carboxy-Glu (Gla); Xaa₂ is Lys, N-methyl-Lys, N,N-dimethyl-Lys or N,N,N-trimethyl-Lys; Xaa₃ is Trp (D or L), halo-Trp or neo-Trp; Xaa₄ is Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr or nitro-Tyr; and Xaa₅ is Pro or hydroxy-Pro; Xaa₆ is Gln or pyro-Glu; and the C-terminus contains a carboxyl or amide group, or derivatives thereof.

22. The substantially pure α -conotoxin peptide of claim 21, wherein Xaa₂ is Lys.
23. The substantially pure α -conotoxin peptide of claim 21, wherein Xaa₁ is Glu.
24. The substantially pure α -conotoxin peptide of claim 21, wherein Xaa₃ is Trp.
25. The substantially pure α -conotoxin peptide of claim 21, wherein Xaa₄ is Tyr.
26. The substantially pure α -conotoxin peptide of claim 21, wherein Xaa₄ is mono-iodo-Tyr.
27. The substantially pure α -conotoxin peptide of claim 21, wherein Xaa₄ is di-iodo-Tyr.
28. The substantially pure α -conotoxin peptide of claim 20, which is modified to contain an O-glycan, an S-glycan or an N-glycan.

- 29 The substantially pure α -conotoxin peptide of claim 21 which is modified to contain an O-glycan, an S-glycan or an N-glycan.
30. A substantially pure α -conotoxin peptide selected from the group consisting of:
Cys-Cys-Thr-Ile-Xaa₅-Ser-Cys-Xaa₄-Xaa₁-Xaa₂-Xaa₇-Xaa₂-Ile-Xaa₂-Ala-Cys-Val-Phe (SEQ ID NO:231) and
Gly-Cys-Cys-Gly-Asn-Xaa₅-Ala-Cys-Ser-Gly-Ser-Ser-Xaa₂-Asp-Ala-Xaa₅-Ser-Cys (SEQ ID NO:232),
wherein Xaa₁ is Glu or γ -carboxy-Glu (Glu); Xaa₂ is Lys, N-methyl-Lys, N,N-dimethyl-Lys or N,N,N-trimethyl-Lys; Xaa₄ is Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr or nitro-Tyr; and Xaa₅ is Pro or hydroxy-Pro; and the C-terminus contains a carboxyl or amide group, or derivatives thereof.
31. The substantially pure α -conotoxin peptide of claim 30, wherein Xaa₂ is Lys.
32. The substantially pure α -conotoxin peptide of claim 30, wherein Xaa₁ is Glu.
33. The substantially pure α -conotoxin peptide of claim 30, wherein Xaa₄ is Tyr.
34. The substantially pure α -conotoxin peptide of claim 30, wherein Xaa₄ is mono-iodo-Tyr.
35. The substantially pure α -conotoxin peptide of claim 30, wherein Xaa₄ is di-iodo-Tyr.
36. The substantially pure α -conotoxin peptide of claim 30, which is modified to contain an O-glycan, an S-glycan or an N-glycan.
37. An isolated nucleic acid comprising a nucleic acid coding for an α -conotoxin precursor comprising an amino acid sequence selected from the group of amino acid sequences set forth in Tables 1-134.

- 39

- ~~protein precursor
acid sequences~~

add B191

[illegible]